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*Joshua Lederberg*

# Some Bad Habits of Reacting To Stress Can Be Unlearned

CONDITIONED REFLEXES have been a favorite subject of psychological experimentation for 50 years. The starting point is usually a simple, already established reflex, like pulling back from a painful electric shock. When the stimulus is applied at the same time as or just after another signal, say a flash of light, the experimental animal is promptly conditioned. That is, it "learns" to retreat from the signal flash in the same way as it does from the shock.

Human subjects show very similar behavior, and the conditioned reflex played a large part in psychologists' earlier thinking about the process of learning in man. More recently, more emphasis has been placed on the observation and imitation of others' behavior as a central element in human intellectual development. Nevertheless, conditioned behavior may still play an important role in body functions and in emotions which are not always so plainly under conscious control.

MORE RECENT studies have made increasing use of "instrumental conditioning." Particular responses to a signal are directly rewarded or discouraged so that the technique need not be attached to a pre-existing reflex.

The discovery of the reward centers in the brain has further advanced such work. When electrodes are implanted in these regions and animals are given the opportunity to press a lever that will send electrical impulses into them, they will self-stimulate these centers almost to the exclusion of any other behavior, ignoring drives like hunger, thirst and fatigue that would otherwise dominate.

It is then possible to set up an apparatus that will respond to some particular behavior whose learning the psychologist wishes to study and to reward the animal for "correct" behavior with an electrical pulse to his reward center. Similar circuits have presumably been evolved within the animal and human brains to facilitate the learning and maintenance of social behavior essential for the preservation of the species.

The most striking results from such experiments have been reported by Drs. Leo V. DiCara and Neal E. Miller of Rockefeller University, New York. Their earlier work had established that rats could be trained, with reinforcement by electric stimulation, to change their heart rate either up or down in response to a tone signal.

This was very difficult without the use of a drug, curare, to dampen the general changes in muscle tension that would accompany changes in heart rate. However, once the animals had learned to make their heart rate change with the tone, the behavior could also be demonstrated without the curare and despite the inappropriateness of changing heart rate without a bodily demand for it.

IN ONE of their most spectacular experiments, they showed that the rats could regulate a difference in blood flow to the right ear vs. the left ear, and without changing blood flow in other parts of the body. Dr. Miller and his colleagues have also shown "learned" responses in kidney function and in contractions of the intestine.

These experiments show beyond doubt that neural circuits exist by which the brain can influence body functions long held to be autonomous. Furthermore, the brain can learn the most inappropriate programs that may still be implemented through these circuits.

The analogy to psychosomatic disease is obvious. In fact, some of these experimenters' rats died of insufficient circulation when they overresponded to stimuli to which a slowing of the heart had been conditioned. Some recent innovations in psychotherapy, so-called behavior therapy, emphasize the importance of unlearning the patient's established bad habits of bodily responses to stressful stimuli.